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EXAMINER	
BERMAN, JACK I	
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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No. 09/891,612	Applicant(s) NAKASUJI ET AL.	
	Examin r Jack I. Berman	Art Unit 2881	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspond nce address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-51 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-5,10-17,19-48,50 and 51 is/are rejected.

7)☒ Claim(s) 6-9,18 and 49 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 23 October 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5,6 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claims 6-9 and 49 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The limitations claimed in claims 6-9 include a partition wall disposed prior to a location at which charged particles or ions or electromagnetic waves irradiated from a plurality of beam sources are introduced into said electron-optical system, said partition wall having a hole in a large aspect ratio through which said charged particles or ions or electromagnetic waves can pass. At lines 9-11 on page 100 the specification defines aspect ratio as the ratio of the diameter of the hole to the length of the hole. This definition means that the holes are circular. This embodiment of the invention is described on pages 97-102 of the specification. Nothing in this description indicates that the beams formed by the individual columns are sheet-shaped. The limitations claimed in claim 49 include "irradiating primary charged particle beams from a plurality of beam sources instead of said sheet shaped primary irradiating beam". A dependent claim may not remove a limitation from a parent claim.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 10, 14, 43-48, and 50 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamazaki et al. Yamazaki et al. discloses a sheet beam based testing apparatus characterized by comprising: a testing chamber for an object under testing (not labeled but inherently required because the electron optics used by Yamazaki et al. will only focus electrons into a beam inside a vacuum); a sheet beam generator (1, 2, 3) for emitting charged particles or ions or electromagnetic waves having energy for expelling secondary charge particles from said object (11) under testing held in said testing chamber as a sheet-shaped primary irradiation beam (31a, 31b) having a predetermined width (see lines 54-59 in column 4); an electron-optical system for introducing (4, 5, 6, 27, 14) said beam (31a, 31b) to said object under testing, and capturing (14, 27, 16, 18, 20) secondary charged particle flux (32a, 32b) generated from said object (11) under testing and introducing said secondary charged particle flux to an image processing system (22, 23, 24, 25); the image processing system (22, 23, 24, 25) for projecting said secondary charge particle flux (32a, 32b) to form a visible image; an information processing system (28, 29) for displaying and/or storing state information of said object under testing based on an output of said image processing system; and a stage (12) for holding said object under testing for relative movement with respect to said electron-optical system. The Yamazaki et al. apparatus includes electrostatic lenses (14, 16, 18, 20), an EXB separator or a Wien filter (27) for separating a secondary charged particle beam emitted from said object under testing from the primary irradiating beam, wherein the amount of deflection of said secondary charged particle beam by a magnetic field of said EXB separator or said Wien filter is twice the amount of deflection by an electric field of the same, and a deflecting direction by said magnetic field is opposite to a deflecting direction by said electric field, and beam deflecting means (4) for forming a primary

irradiating beam or deflecting the primary irradiating beam to sequentially irradiate regions under testing on said object under testing with the primary irradiating beam. Yamazaki et al. teaches to use the apparatus disclosed to inspect wafers or semiconductors for defects, which includes defective circuit wires, measurement of line widths, measurement of alignment precision, and measurement of potential contrast.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. Yamazaki et al. does not teach to use the apparatus disclosed to expose a wafer, but since the apparatus inherently constitutes a type of scanning electron microscope and electron beam lithography devices were originally developed from scanning electron microscopes, it would have been obvious to a person having ordinary skill in the art to use the Yamazaki et al. apparatus to delineate a circuit pattern of a semiconductor device on a wafer or a reticle.

Claims 2, 4, 5, 22, 25,and 39-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. in view of Lo et al. Yamazaki et al. does not teach how the object under test is moved in or out of the (inherently required) testing chamber, how the testing chamber is held at vacuum, to isolate the object under test from vibrations, to precharge the object under test, how the object under test is held, or how the positioning of the object under test is determined. Lo et al. discloses scanning electron beam inspection apparatus similar to Yamazaki et al.'s and teaches at lines 53-60 in column 7 that transport mechanisms for securing an object under testing for transportation into and out of a testing chamber are conventional. It would have been obvious to a person having ordinary skill in the art to provide the Yamazaki et al. apparatus with the conventional transport mechanism cited by Lo et al. At lines 48-53 in column 7, Lo et al. teaches to provide a vibration isolator (50) for preventing vibrations of the object under testing; and a vacuum device (48) for holding the inside of the testing chamber at a vacuum. It would have been obvious to a person having ordinary skill in the art to provide these devices in the Yamazaki et al. apparatus because vibrations would be as detrimental to image resolution in the Yamazaki et al. apparatus as they would be in the Lo et al. apparatus and some means would have to be provided to maintain the vacuum required by both patented apparatuses. At lines 37-55 in column 6, Lo et al. discloses a precharge unit and, beginning at line 48 in column 9, explains in detail how precharging removes variations of charge accumulated on an object under test. It would have been obvious to a person having ordinary skill in the art to apply this teaching of Lo et al.'s to the Yamazaki et al. apparatus in order to prevent the problems discussed by Lo et al. At lines 33-34 in column 7, Lo et al. teaches to use an electrostatic chuck (24) that electrostatically sucks and holds an object to support an object under test (22) and at

lines 4-20 in column 7 Lo et al. teaches to use such a chuck to apply a voltage to the object (22) from a bias source (28) and to increase or decrease this voltage from zero to a predetermined value. Since Yamazaki et al. teaches at 30-35 in column 5 that a predetermined voltage must be applied to the object under test, it would have been obvious to a person having ordinary skill in the art to use the electrostatic chuck cited by Lo et al. to both hold the object and apply the required predetermined voltage. Yamazaki et al. also teaches at lines 31-32 in column 7 that the movement of the stage on which the object under test is held must be controlled by a controller. Since Lo et al. teaches at lines 38-44 in column 7 and lines 38-40 in column 8 that such a controller may comprise a laser interference type distance measuring unit (laser interferometer) for providing feedback to determine the coordinates of the stage, it would have been obvious to a person having ordinary skill in the art to provide such an alignment controller including a laser interferometer as the controller required by Yamazaki et al. At lines 3-17 in column 6, Yamazaki et al. discloses an image processing system having image capturing means that includes a fluorescent screen and a micro-channel plate and a solid-state imager device (CCD) camera to detect secondary charged particles for capturing each of images of a plurality of regions under testing on said object under testing, which images are then sent to an "image data host computer 29 [that] displays an image on a display 30, saves and processes image data, and so forth." Clearly Yamazaki et al. uses a conventional image processor. Lo et al. teaches, at line 63 in column 7 through line 11 in column 8, that such a conventional image processor includes a "die-to-reference" algorithm that, by definition, inherently requires means for storing a reference image and an information processing system for comparing said images of the regions under testing with the reference image to determine a state of said object under testing. It would have

been obvious to a person having ordinary skill in the art to use the conventional image processor described by Lo et al. as the nominally recited "image data host computer". It is noted that the limitation in claim 40 that the plurality of images of the regions under testing captured by said image processing means are captured as they are displaced from one another while partially overlapping on said object under testing is a limitation on the method of using the claimed sheet beam testing apparatus, not on the apparatus itself, and therefore can not patentably distinguish the claimed apparatus.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. and Lo et al. as applied to claim 2 above, and further in view of Davis et al. While Lo et al. teaches a person having ordinary skill in the art to provide the Yamazaki et al. apparatus with a conventional transport mechanism, including a loading chamber (loadlock subsystem 52), and to provide a vibration isolator (50) for preventing vibrations of the object under testing, neither Yamazaki et al. nor Lo et al. discuss the problem of dust adhering to a wafer as the loading chamber is evacuated. Davis et al. discusses this problem at line 64 in column 10 through line 31 in column 11 and teaches that it occurs whenever wafers are transferred into a vacuum chamber through a loading chamber and further teaches to solve it by supplying a clean gas to the wafer. It would have been obvious to a person having ordinary skill in the art to apply Davis et al.'s solution to this problem, which would inherently occur in the Yamazaki et al./Lo et al. apparatus discussed above, by using Lo et al.'s loadlock subsystem as a mini-environment chamber for supplying a clean gas to said object under testing to prevent dust from attaching to said object under testing. Davis et al. also teaches, at lines 20-27 in column 23, that any number of load lock chambers and processing modules and transfer arms can be provided to deliver wafers between

any two chambers in any sequence if desired. The provision of a plurality of loading chambers disposed between the mini-environment chamber discussed above and the testing chamber, each adapted to be independently controllable in a vacuum atmosphere, a first transport unit for transporting an object under testing between one of the loading chambers and the mini-environment chamber, and a second transport unit for transporting said object under testing between one of said loading chambers and said testing chamber would therefore have been an obvious duplication of parts in accordance with Davis et al.'s suggestion.

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. in view of Abe et al. The Yamazaki et al. apparatus has several electrodes, but these electrodes are not described in detail. Abe et al., on the other hand, discloses electrodes formed as metal films for use in an electron optical column and teaches, at lines 26-32 in column 4 that the use of platinum as the material of such metal coatings is advantageous because platinum does not react with a plasma used to clean the electron optical column so a problem with charge-up (accumulation of charge on non-conductive deposits on an electrode) does not occur. It would therefore have been obvious to a person having ordinary skill in the art to use coatings of platinum to form the required electrodes in the Yamazaki et al. apparatus in order to avoid charge-up problems in the manner taught by Abe et al.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. in view of Bachman. The Yamazaki et al. apparatus has several electrostatic lenses, but these lenses are not described in detail. Bachman, on the other hand, discloses an electrostatic lens including a plurality of electrodes (18, 19) having potential differences, and an insulating material (10) positioned between said electrodes for holding said electrodes, at least one

electrode (19) having a first electrode surface having a minimum inter-electrode distance, a second electrode surface having an inter-electrode distance longer than said first electrode surface, and a step between both said electrodes (18, 19); said insulating material (10) being positioned between said second electrode surface and another electrode (18) for substantially vertically supporting each electrode; and a minimum creeping distance of said insulating material between said electrodes is substantially equal to an inter-electrode distance in said supported electrode portion. It would have been obvious to a person having ordinary skill in the art to use the electrostatic lens disclosed by Bachman as at least one of the unspecified electrostatic lenses required by Yamazaki et al.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. in view of U.S. Patent No. 5,892,224 to Nakasuji. While Yamazaki et al. uses only a single irradiating beam to inspect a wafer or semiconductor, the Nakasuji patent to more rapidly inspect a large area on a wafer by irradiating a plurality of first irradiating beams to an object under testing to emit secondary charge particles, and introducing these secondary charged particles to an image processing system. It would have been obvious to a person having ordinary skill in the art to provide the Yamazaki et al. apparatus with a plurality of irradiating beams in the manner taught by Nakasuji in order to more rapidly inspect a large area on a wafer.

Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. in view of Hattori et al. Yamazaki et al. does not teach how the voltage to be applied to the objective lens is determined. At lines 9-33 in column 7, Hattori et al. teaches to adjust the focus of an objective lens by measuring first data indicative of rising of a secondary charged particle beam signal waveform when a pattern edge parallel in a first direction is moved

in a second direction in regard to an excitation current of an objective lens, and second data indicative of rising of the secondary charged particle beam signal waveform when a pattern edge parallel in said second direction is moved in said first direction; and approximating each of said first data and said second data using quadratics, finding an excitation condition for said objective lens indicative of a minimum value of each quadratic, and fitting said excitation current of said objective lens to an algebraic mean of said found excitation condition. While the Hattori et al. method is disclosed in terms of adjusting the focus of an electromagnetic lens by adjusting the excitation current, it is well known in the art that electrostatic lenses are functionally equivalent to electromagnetic lenses for the purpose of focusing charged particle beams, but the focus of an electrostatic lens is adjusted by adjusting an excitation voltage rather than an excitation current. It would therefore have been obvious to a person having ordinary skill in the art to use the Hattori et al. method to set the focus of Yamazaki et al.'s electrostatic objective lens by providing a measuring mechanism for measuring first data indicative of rising of a secondary charged particle beam signal waveform when a pattern edge parallel in a first direction is moved in a second direction in regard to an excitation voltage of an objective lens rather than an excitation current, and second data indicative of rising of the secondary charged particle beam signal waveform when a pattern edge parallel in said second direction is moved in said first direction; and control means for approximating each of said first data and said second data using quadratics, finding an excitation condition for said objective lens indicative of a minimum value of each quadratic, and fitting said excitation voltage of said objective lens to an algebraic mean of said found excitation condition. At lines 34-37 in column 7, Hattori et al. further teaches to use the control means used to adjust the focus of the objective lens to also correct astigmatism. It

would therefore also have been obvious to a person having ordinary skill in the art to apply this teaching to the Yamazaki et al./Hattori et al. apparatus discussed above in order to correct any astigmatism in Yamazaki et al.'s objective lens.

Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. in view of Watanabe et al. Watanabe et al. teaches that scanning electron microscopes face a problem caused by vibrations because such vibrations cause the image formed to vibrate. Watanabe et al. teaches to solve this problem by providing a scanning electron microscope with a mechanical construction for determining a position of said object under testing at which a primary irradiating beam (2) is emitted, a piezoelectric element (9) for receiving a force from vibrations of said mechanical construction; and a vibration attenuating circuit (17) electrically connected to said piezoelectric element for acting to attenuate output electric energy. According to Watanabe et al., the vibration attenuating circuit drives the piezoelectric element at a resonant frequency of the mechanical construction. By definition, any circuit capable of driving a piezoelectric element at a resonant frequency must be tuned, which inherently requires that an inductive means must be determined with respect to the static capacitance of that element, and since Watanabe et al. does not provide any superconductors, the circuit must also have some resistive elements. It would have been obvious to a person having ordinary skill in the art to provide the Yamazaki et al. apparatus with Watanabe et al.'s vibration attenuating means in order to avoid the vibration problems discussed by Watanabe et al.

Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. and Lo et al. as applied to claim 22 above, and further in view of Livesay. As is discussed above, it would have been obvious to a person having ordinary skill in the art to use

the electrostatic chuck cited by Lo et al. to both hold the object and apply the required predetermined voltage in the Yamazaki et al. apparatus. However, Lo et al. does not specify a particular structure for the electrostatic chuck. Livesay discloses an electrostatic chuck comprising an electrode divided into a central portion (28) used to apply a low potential or ground potential to a wafer (11), see lines 3-12 in column 6, and a peripheral portion (26) to which a different potential is applied. When a wafer is placed on the chuck, the assembly forms a laminate of a substrate (wafer 11), an electrode (26) and an insulating material (dielectric sheet 25), wherein the wafer is applied with a voltage through a predetermined resistor (the resistance inherent in the contact (28) and the wiring connecting the contact to the voltage source (32)) and a contact (28), said contact (28) having a shape such that its leading end comes in contact with a back surface of said object under testing. It would have been obvious to a person having ordinary skill in the art to use Livesay's electrostatic chuck as the unspecified electrostatic chuck suggested by Lo et al. The use of some of the peripheral portion (26) of the electrode instead of Livesay's connecting arm underneath and isolated from the peripheral portion to connect the central portion (28) of the electrode to the voltage source would have been an obvious substitution of equivalent parts.

Claims 26, 27, and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. in view of Petric. As is discussed above, Yamazaki et al. does not give any details about the stage positioning equipment and evacuation devices required for the disclosed sheet beam testing apparatus. Petric discloses a stage (30) for holding an object to be irradiated with a focused electron beam with a degree of freedom at least equal to or more than two with respect to the electron-optical system, said stage (30) comprising a non-contact supporting

mechanism by means of static pressure bearings (see lines 10-15 in column 8), and a vacuum sealing mechanism (20) through differential pumping, and a partition (20) containing a differential pumping structure is disposed between a location of said object which is irradiated with the beam and a static pressure bearing support of said stage for reducing a conductance to produce a pressure difference. At lines 56-59 in column 7, Petric teaches that the surface (9) of parts facing the static pressure air bearing should be ground to form a flat surface, this grinding inherently constituting a surface treatment that reduces released gases because it removes pits in which gases might be trapped. It would have been obvious to a person having ordinary skill in the art to use the Petric apparatus as the stage positioning equipment and evacuation devices required for the Yamazaki et al. sheet beam testing apparatus since the Petric apparatus is designed to permit the irradiation of objects with a focused electron beam of the type used by Yamazaki et al. While Petric uses air as the gas supplied to the static pressure bearings, the use of dry nitrogen or inert gas would have been an obvious substitution of equivalent materials to exert a static gas pressure. It would also have been obvious to a person having ordinary skill in the art to exhaust the gas supplied to the static pressure bearing from a housing for containing said stage, and thereafter pressurizing the gas and again supplying it to said static pressure bearings in order to avoid wasting the gas.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. and Petric as applied to claim 26 above, and further in view of Lamattina et al. At lines 8-9 in column 4, Lamattina et al. teaches that it is known in the art to use a cold trap to back up a roughing pump and a high vacuum pump. It would therefore have been obvious to a person having ordinary skill in the art to use such a cold trap in the differential pumping structure that

forms a partition in both the Lamattina et al. apparatus (as envelope apparatus 29 and 39) and the Petric apparatus (as envelope 20 and 87) when using this structure to permit the irradiation of the object under test in the Yamazaki et al. apparatus.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. and Petric as applied to claim 26 above, and further in view of Bisschops et al. As can be best seen in Figure 4, Bisschops et al. teaches that when a static pressure bearing (21) is used to support a stage (14) that supports a wafer (W) inside the vacuum chamber (V) of a lithography system (2), it is advantageous to provide a partition (sliding seal plate 12) near the pressure bearing to minimize loss of vacuum. Since the Petric apparatus uses a pressure bearing as well as a partition near the electron beam generator, it would have been obvious to a person having ordinary skill in the art to apply the teachings of Bisschops et al. by providing an additional partition near the pressure bearing if the Petric apparatus is used as the stage in the Yamazaki et al. sheet beam based testing apparatus in order to maintain the lowest pressure possible at the surface of the wafer under test.

Claims 33-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. in view of Nagai et al. At lines 30-35 in column 5, Yamazaki et al. teaches to provide the patented sheet beam testing apparatus with a retarding voltage applying unit (power supply 13) for applying said object under testing with a retarding voltage. The value of the voltage to be applied to the sample 11 must be determined on the basis of the resolving performance of the mapping projection optical system. This inherently involves applying varying retarding voltages to the object under test and, based on the magnitude of a distorted pattern or a blurred pattern at a particular site in the image of said object under testing, evaluating the charging state of the object

and adjusting the retarding voltage applied to the object so as to achieve the finest resolution. Nothing in Yamazaki et al. precludes forming this testing image near a boundary where a pattern density largely varies on said object under testing which is applied with a plurality of retarding voltages. As is mentioned above, Yamazaki et al. does not define structural details of the electrostatic lenses used in the sheet beam testing apparatus. Nagai et al. discloses an electrostatic lens comprising an axially symmetric lens produced by working a bulk of insulating material (11) and coating the surface with a metal (13). It would have been obvious to a person having ordinary skill in the art to use the Nagai et al. electrostatic lens as one of the nominally recited electrostatic lenses in the Yamazaki et al. apparatus because the Nagai et al. lens is designed for use in just such an electron optical column.

Claim 18 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach to provide a sheet beam testing apparatus with an electrostatic objective lens comprising two electrodes and a control mechanism for changing the voltage on one electrode to largely (i.e. coarsely or roughly) change the focal distance of the lens and to the other electrode to change the focal distance of the lens in a short time (i.e. to finely control the focus of the lens).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack I. Berman whose telephone number is (703) 308-4849. The examiner can normally be reached on M-F (8:30-6:00) with every second Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (703) 308-4116. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Jack I. Berman

Jack I. Berman
Primary Examiner
Art Unit 2881

jb
August 29, 2003